

Incorporating Modeling into Decision-Making for a Comprehensive Aquifer Management Plan: A Facilitator's Observations on Idaho's Eastern Snake Plain

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Introduction

Supply of and demands for water are out of balance in Idaho's Eastern Snake River Plain. Conflicts among water users and between water users and the State have arisen over the process and impacts of conjunctive management of surface and groundwater resources under Idaho's prior appropriation doctrine. After decades of litigation, the State's Legislators asked the Idaho Water Resource Board to create a Comprehensive Aquifer Management Plan (Plan) to ease conflict and design a path to improved aquifer management, and improved relations among those that rely on it for their lives and livelihoods.

This paper provides background information on a case study to be presented by Diane Tate of CDR Associates during the workshop on the design and practice of Computer Aided Dispute Resolution (CADRe) for water resource management. The Idaho Water Resource Board (IWRB) retained Ms. Tate and Jonathan Bartsch of CDR in August of 2006 to facilitate development of a Framework for the Plan, and the creation of the Plan itself. Much of the information presented in this background document comes from the Framework approved by the IWRB in February 2007, and further information is available on the project website (www.esaplan.idaho.gov).

Physical Description

The Eastern Snake Plain covers 29,000 square miles in southeastern Idaho – approximately 35% of the State's land area, and all or part of 20 counties. The Snake River itself originates near the continental divide in Yellowstone National Park. It enters Idaho at Palisades Reservoir, and joins with the Henry's Fork River near Rigby. The ESPA – or the Eastern Snake Plain Aquifer – underlies 10,000 square miles of the Eastern Snake Plain, from Ashton to King Hill. Comprised of layered basalt, the aquifer is thousands of feet thick in some places. Groundwater flows generally northeast to southwest, and interacts with surface water in many locations. Water discharges to the river through thousands of springs along canyon walls and underneath the riverbed. Similarly, river water descends into the aquifer from many locations along the Snake's winding path.

Charge from the Legislature

Senate Concurrent Resolution No.136, passed by the Idaho Legislature in April of 2006, requested that the IWRB “expeditiously pursue, with support from the Idaho Department of Water Resources (IDWR), development of a comprehensive aquifer management plan

for the Eastern Snake River Plain Aquifer for submission to and approval by the Idaho Legislature.” The Resolution directed the Board to solicit public input regarding development of the “goals, objectives and methods” for aquifer management from “affected water right holders, cities and counties, the general public and relevant state and federal agencies.” The Legislature also asked the Board to provide a status report during the next legislative session, together with a “framework for the plan, including appropriate interim goals and objectives in accordance with state law, a method to fund implementation of the plan and a time schedule for finalization of the plan.”

In Concurrent Resolution 136, the Legislature listed factors driving the need for a comprehensive aquifer management plan, including:

- Reduced spring discharges and areas of declining aquifer levels resulting from extended drought, changes in irrigation practices and ground water pumping;
- Conflict between water rights holders stemming from insufficient water supplies to satisfy existing beneficial uses;
- The threat to the state’s economy posed by ongoing conflict between water users;
- Resources already committed to the Conservation Reserve Enhancement Program (CREP);
- Previous actions taken by the Legislature to manage the ESPA, including legislation to create water measurement districts and groundwater districts, and previous funding for project implementation and mediation between parties;
- Previous actions taken by IDWR, including the expansion and creation of water districts for the purposes of conjunctive administration;
- The authority vested in the Board to cooperate in water studies, planning and research, and the work already done by the board to inventory data and information related to the ESPA;
- The good faith efforts of water rights holders to contribute to a resolution to the conflict; and
- The determination of the legislature to facilitate and encourage a resolution of the surface/groundwater rights conflict that respects existing water rights and protects the welfare of the people of the state of Idaho by ensuring the aquifer is managed in accordance with state law.

The IWRB hired CDR Associates to provide neutral facilitation assistance in the development of a Framework. CDR Associates initiated the Framework process by conducting over 90 in-person and phone interviews with affected water rights holders and other stakeholders in August and September, 2006. The Board held public meetings in October 2006 and January 2007 to receive input on the ESPA Framework process, and convened a series of working group meetings to develop the management alternatives presented in the final document. The facilitators invited everyone interviewed during the Framework and all public meeting attendees to participate in the working group meetings. Approximately 45 people attended each of three meetings.

The final Framework outlined goals and objectives for aquifer management, management alternatives (actions to increase supply or manage demand), proposed funding strategies

to implement management actions, and suggested interim measures to be taken during development of the detailed Plan. The Legislature heard presentations from the Board and facilitators regarding Framework content and process in February and March, and appropriated funding to continue with development of a Comprehensive Management Plan for the Eastern Snake Plain Aquifer.

The IWRB established an ESPA Advisory Committee to develop recommendations for the Plan, with 32 stakeholder representatives nominated by stakeholders and confirmed by the Board and 7 agency participants. The Advisory Committee held their first meeting in May 2007, and meets on a monthly basis.

Stakeholders

The majority of ongoing litigation in the Eastern Snake deals with disputes between holders of senior and junior water rights. This includes canal companies holding both natural flow and storage rights within the surface water system, municipal and agricultural groundwater pumpers, and spring water users. Also at the table are federal and state agencies, including those that protect fish and wildlife as a part of their public trust responsibilities. The IWRB also included business interests, county governments, land developers, and hydropower producers in the membership of the Advisory Committee.

Ongoing Modeling Efforts

Since the 1970s, state and federal agencies, universities and private interests have developed groundwater flow models of the ESPA for various purposes. The University of Idaho developed the first numerical model of the aquifer for the Idaho Department of Water Resources (IDWR) and the U.S. Bureau of Reclamation. IDWR has used various versions of this model as a planning and management tool for over twenty years. Researchers converted the model to MODFLOW in 1999, and modified code to improve representation of the physical system. The current version is known as the Enhanced Snake Plain Aquifer Model (ESPAM)

The ESPAM was created with extensive review and input from the Eastern Snake Hydrologic Modeling Committee (ESHMC) during the period from 1999 through June 2005. The ESHMC is comprised of professionals working on water issues on the eastern Snake River Plain. Regular members include agency representatives (Idaho Department of Water Resources, U.S. Bureau of Reclamation, U.S. Geological Survey, U.S. Fish and Wildlife Service), industry representatives (Idaho Power), researchers (University of Idaho, Idaho Water Resources Research Institute) and private consultants representing water users on the eastern Snake River Plain. The ESHMC was formed in 1998 and was a follow-on to the previous Idaho Technical Committee on Hydrology (ITCH) which had a similar function. The ESHMC was originally formed to allow researchers and water users a forum for discussing water issues and research on the eastern Snake River Plain and is chaired by the Idaho Department of Water Resources.

Model reformulation was funded jointly by the State of Idaho, Idaho Power and the U.S. Bureau of Reclamation, with in-kind services provided by the U.S. Geological Survey. The ESHMC oversaw the reformulation of the model, with the actual modeling done by the Idaho Water Resources Research Institute (IWRRI) at the University of Idaho. IWRRI presented major design alternatives to ESHMC members for discussion and guidance. Model development was accomplished in an open environment, with acceptance of design input from all committee members, in an attempt to allay concerns regarding technical bias. In the Framework, the IWRB recommended use of this model, which continues to be updated and improved, to quantify and analyze the potential benefits and other impacts of management alternatives to be explored during the development of the Plan.

Bringing the Advisory Committee and the ESHMC Together

In July of 2007, the ESPA Advisory Committee and the ESHMC began discussions on how best to work together to accomplish their mutual goals. The questions being considered by the Advisory group that may involve consultation with the modeling committee include the following:

- How can the State quantify targets for management of the aquifer?
- What combination of management actions will most likely meet the targets?
- How could the hydrologic future be different from the past? What impacts would climate variation, changes in crop mix, changes in agricultural practices, shifts in commodity prices, etc. have on management actions?
- If an adaptive management strategy is pursued, how can the model help?

Before the Advisory Committee can articulate detailed questions for the model, however, basic education must take place. Over the next few months, committee members will be asking modelers to help them explore the following questions:

- What can this model do? What questions can it answer? What questions is it not suited to answer?
- What assumptions does the model include?
- What are the limitations of the model?
- On what scale does the model operate?
- What are the inputs to the model, and what are the outputs?
- During the calibration period, how does the model compare to observed data?

Challenges include working with one established group with limited membership, and another that is brand new with a diverse group of stakeholders. However, the facilitators believe that linking the modeling and plan development processes is essential, because the model cannot make policy choices, and the committee making those policy choices cannot understand potential impacts of decisions without the model.

REFERENCES

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NOTES FROM THE PRESENTATION

The above paper was provided as background material for participants in advance of the workshop. Additional detail was provided during the presentation and in through the discussion that followed. Included were the following topics:

- IWRB said there was no need to talk to more than 15 people, but CDR interviewed more than 90.
- Tribes were also involved in the Advisory Committee.
- During the presentation, the author described each stakeholder group as having its own expert, and that the experts are their own cabal. There were questions about whether the model was answering the right question/ that the nodes in the MODFLOW model were at the right scale to answer questions – that the model “was good enough for planning but not for regulation.”
- How were working groups differentiated? Were they heterogeneous (focusing on different issues) or homogeneous (multiple, generic working groups)?
- Was there overlap between the ESPA Advisory Committee and the ESHMC?
- This is a case of a “legacy model,” since the ESPA Advisory Committee were not involved in the development stages, and had to be brought up to speed on it. Is there any option for model modification, or is the education about the model one-way?
- It sounds like the model was collaboratively modeled by technical people and is now being proposed to help resolve management disputes. The existing legacy model’s structure (a) may or may not be trusted by all stakeholders, and (b) model outputs may or may not be in terms of performance measures that resonate with some stakeholders.
- What has been the level of transparency and flexibility in the model platform, and has this been important to the process?
- What were the specific objectives and performance measures developed?

During model development and the Framework, were conflicts/disagreements encountered and satisfactorily resolved? How happy were the groups with the resulting model?